

09/942,884

Attorney Docket No. 14017-1

AMENDMENTS

Please amend Claims 1 and 39 as follows:

1. (Currently Amended) A flow controller, comprising:

- (a) a channel having
 - (i) a fluid inlet in liquid communication with a fluid source at pressure P1,
 - (ii) a fluid outlet at pressure P2, wherein $P2 < P1$, and
 - (iii) a porous dielectric material disposed in said channel;

- (b) a fluid contained within said channel;

- (c) spaced electrodes in electrical communication with said fluid for applying a potential difference end-to-end across said porous dielectric material within said channel;

- (d) a power supply in electrical communication with said electrodes for applying an electric potential to said spaced electrodes,

whereby wherein said electric potential difference generates an
electroosmotically-driven flow component through said channel that modulates a pressure-driven flow component resulting from the P1 - P2 pressure differential for controlling the flow through the channel.

Claims 2- 3. (Withdrawn)

4. (Original) The flow controller of claim 1, wherein said power supply is a variable power supply.

5. (Original) The flow controller of claim 1, wherein said pressure-driven and said electroosmotically-driven flow components through said channel are in the same direction.

6. (Original) The flow controller of claim 1, wherein said pressure-driven and said electroosmotically-driven flow components through said channel are in the opposite direction and the pressure-driven fluid flux is greater than or equal to the electroosmotically driven fluid

09/942,884

Attorney Docket No. 14017-1

flux.

7. (Original) The flow controller of claim 1, wherein said electrical communication is through a bridge.

8. (Original) The flow controller of claim 1, wherein said channel has a circular cross-section.

9. (Original) The flow controller of claim 1, wherein said channel comprises a fused silica capillary.

10. (Original) The flow controller of claim 1, wherein the porous dielectric material includes silica particles.

11. (Original) The flow controller of claim 10, wherein the silica particles have a diameter of between about 100 nm and 5 μ m.

12. (Original) The flow controller of claim 1, wherein the porous dielectric material includes porous dielectric materials fabricated by processes selected from the group consisting of lithographic patterning and etching, direct injection molding, sol-gel processing, and electroforming.

13. (Original) The flow controller of claim 1, wherein the porous dielectric material includes organic polymer materials.

Claims 14 – 38 (Withdrawn).

39. (Currently Amended) A method for controlling a flow of a fluid, comprising:

(a) providing spaced electrodes in electrical communication with a fluid;

(b) applying a potential difference end-to-end across a porous dielectric material within a channel, said channel having a fluid inlet in liquid communication with a fluid source at

09/942,884

Attorney Docket No. 14017-1

pressure P1, and a fluid outlet at pressure P2, wherein $P2 < P1$; and

(c) applying an electric potential to the spaced electrodes, wherein in electrical communication with a fluid contained within a channel, said channel having a porous dielectric material disposed therein, said channel also having a fluid inlet in liquid communication with a fluid source at pressure P1, and a fluid outlet at pressure P2, wherein $P2 < P1$ and whereby said electric potential generates an electroosmotically-driven flow component through said channel that modulates a pressure-driven flow component resulting from the $P1 - P2$ pressure differential for controlling the flow through the channel.

40. (Withdrawn).

41. (New) A flow controller having an electroosmotically-driven flow component and a pressure-driven flow component, the flow controller comprising:

a) a channel having:

i) a fluid having a fluid flow rate;

ii) a porous dielectric material; and

iii) spaced electrodes in electrical communication with the fluid for applying a potential difference end-to-end across the porous dielectric material within the channel;

b) a power supply in electrical communication with the spaced electrodes for applying an electric potential to the spaced electrodes;

c) a sensor for monitoring at least one control signal; and

d) a controller connected to the sensor and the power supply to control the electroosmotically-driven flow component by maintaining the control signal within a predetermined range and modulating the electric potential applied by the power supply, wherein

the fluid flow rate within the channel is controlled by the electroosmotically-driven flow component which modulates the pressure-driven flow component.